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The embodied narrative nature of learning:

Nurture in school

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The embodied narrative structure of learning:

Nurturing human nature in school

Abstract

Learning is participatory and embodied. It requires active participation from both teacher and learner to come together to co-create shared projects of discovery that allow meaning to unfold and develop between them. This paper advances theory on the intersubjective and embodied nature of cognition and meaning-making as constituted by co-created narrative units. Learning within embodied narrative episodes incorporate affective, energetic, and intentional components to produce schemas of engagement that structure knowledge and become units held in memory. We examine two cases of non-verbal narrative patterns of engagement between teacher and child within Nurture Group practice, a special pedagogy that attunes to the affects and interests of children. Analysis of these cases reveal patterns that established shared rhythm, affect, and body movement between teacher and child, which, on completion, generated shared joy and learning. Thus, we identify an embodied, co-created narrative structure of embodied cognition essential for learning and participatory meaning-making.

keywords: embodied cognition, narrative, meaning-making, social emotional behavioural difficulties, co-created meaning, Nurture Group, child development, intersubjectivity

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Introduction

Learning as embodied participation

Learning in school is never simply a case of engaging higher cognitive function with the thoughts and ideas that populate our intelligence. Rather, children learn about their world by active engagement with the people, objects, ideas and the relations between them that make it up (Baldwin, 1895; Bernstein, 1967; Piaget, 1953; Vygotsky, 1978). These engagements are at their heart constructed by *voluntary* compositions of movements of the body that include with them *autonomic* control to generate the energy resources, level of arousal, sustained attention, and organisation of movement required for the successful completion of tasks (Trevarthen, 1984, 1986; Von Hofsten, 1989). Children learn and develop within these embodied engagements that are created by an active mind whose interests and intentions are put into effect through purposeful body action. These actions in turn bring with them feelings of safety and security or anxiety and threat with vital consequences to internal visceral regulations (arousal, energy, heart beat, breathing). Children bring their whole experience to bear on a situation within an imagination of its unfolding future and coloured by vital affectivity generated through coordinated motor skill (Trevarthen & Delafield-Butt, 2013b). Learning is never just cognitive; it is embodied and participatory. The nature of this participatory embodiment is core concern for enquiry into the mind, brain, and education (Osgood-Campbell, 2015; Stolz, 2015) and is the focus of this paper.

Especially in early childhood, it is evident how knowledge is gained in rich psycho-physical experiences through dynamic interaction with one's own body, people, places, and things (Trevarthen & Delafield-Butt, 2015). Engagement made through purposeful movements of the body generates particular responses from the world, and these are both anticipated and learned. A rap of the knuckles on wood creates a hollow knock with the full force of impact felt in the bones, together with its acoustic result heard by the ears and affective joy felt in the smiles of pleasure of playmates. Such action on objects requires skilfully placed forces patterned across the body and made in anticipation of their result, the act itself accommodating unexpected contingencies, compensating for them, and appropriating the result into a memory that includes all its prehensions: affective, sensory, and social. Interaction with the world is a process. It is not static, not a fact to be learned, but an experience to be created.

Knowledge is gained through active, participatory sense-making, especially in concert with social others (De Jaegher & Di Paolo, 2007; Trevarthen & Delafield-Butt, 2013b). Intersubjective interactions are more than merely processes that provide a social context for learning. Rather, the interactive processes themselves serve as a mechanism for learning and making sense of the world. De Jaegher, Di Paolo, and Gallagher (2010) define the co-constructive nature of social interaction as “a co-regulated coupling between at least two autonomous agents, where... the co-regulation and the coupling mutually affect each other... and the autonomy of the agents involved is not destroyed (although its scope can be augmented or reduced)”. Meaning is co-created within the organisation of the interaction, structured by the agencies and power of will with its expressions of interest and intention from both sides, constituting something unique: a dyadic (or greater) unit that is more than the sum of its parts. Meaning-making in intersubjective, participatory sense-making is never just a case of one dictating to a receptive other (De Jaegher, Perakyla, & Stevanovic, 2016). It is

two powers, two sources of agency, feeling, and intention coming together to produce something more. And it is a foundation for learning.

Feeling, Vitality, and Agency in Learning

Feelings that evaluate the world and affect one's sense of safety, confidence, and capacity to perform are an important part of an individual's agency in learning. Children and adults are emotional creatures with a deep phylogenetic ancestry that grounds learning and its future accomplishments in the ancient affective evaluations that appraise one's successes, or failures (Packard & Delafield-Butt, 2014). This 'feelingful' foundation of experience and learning is tightly coupled to the vital, autonomic regulations of the body generated within motive centres in core brainstem systems that engage the world by generating action (Aitken & Trevarthen, 1997; Panksepp, 2005; Porges & Furman, 2011). Learning the consequences of one's actions at this primary ontogenetic level occurs first in the integrative actions of the brainstem, the primary generator of action. It is not in cortex with its complex processing in regions such as the amygdala that first generate feeling. Rather, the brainstem complex of sensory-motor nuclei shared between all mammals and most vertebrates is also the site of learning the effect of those actions – a primary level of operation at the heart of learning the contingent, vital responses to one's action. Winn (2012) attempts to “put the brain back in brainstem” in our understanding of the role of this basic, central neural structure. We now understand, following affective neuroscientist Jaak Panksepp's careful comparative studies of mammalian brain and behaviour that brainstem is the seat of the core experience of Self, the origin of agency with its motivation to engage and feelings of interest, playful curiosity or safety (Northoff & Panksepp, 2008; Panksepp & Northoff, 2009).

It is from brainstem that the impulse for movement is generated, from the core of the individual's sense of Self (Aitken & Trevarthen, 1997; Delafield-Butt & Trevarthen, 2013),. Such actions contain within them a perceptual knowledge of the world (from the distance

receptors of sight, sound, and smell), knowledge of the body-in-action (from the proprioceptive system), and knowledge of the body's vital need (from visceroreception of the internal organs) (Sherrington, 1906). Recent comparative neuroanatomy demonstrates brainstem is responsible for perception, feeling by affective evaluation, and intentional control of purposeful movement (Merker, 2007; Vandekerckhove & Panksepp, 2011). Brainstem generates the first active, future seeking agency of an individual that is the foundation of our conscious experience of life (Low, 2012).

This core Self is rarely passive, but acts out into the world to test its contingencies and to generate understanding through exploratory engagement. On its own without other brain regions it has limited scope and power. It cannot perform complex perceptual discrimination, abstract reasoning, nor sophisticated motor planning. These are capacities that develop in concert with the cortex. In human development, agency develops in sophistication and power as the brain grows and the cortex matures (Vandekerckhove & Panksepp, 2011). Simple actions performed *in utero* and those first gestures in early infancy, made with a caring and sensitive care-giver, quickly develop in early childhood into more sophisticated motor skills with greater precision and awareness of range of expected contingencies. Single simple actions and small projects of the kind generated by brainstem systems can be chained together to form projects and projects of projects of action with distal reach far into the future (Pezzulo & Castelfranchi, 2009). But always, no matter how sophisticated and abstract an intelligence may become in childhood and later adult life, performed action remains tethered to the present moment within its small domain of immediate power of just under one second, or in small projects that reach a few seconds into the future (Delafeld-Butt & Gangopadhyay, 2013). With new capacities of cortical abstraction and planning developed over a childhood of learning, one becomes able to act in the present moment to serve a future, imagined need that may not arise for minutes, hours, days, or years to come. A student studies intensely in

the present moment to achieve a degree months away, and a lifestyle that may not be realised for many years. We generate the future we desire, one movement at a time.

The Prospective Structure of Engagement: Reaching for the anticipated future

Interestingly, these processes of engagement are structured by their anticipated consequences (Baldwin, 1895). From the first integrated actions of the developing human agent, movement is fundamentally prospectively organised, geared to future expectations by necessity of the laws of biomechanics (Bernstein, 1967). The forces of inertia and momentum generated in a single act, such as an extension of the hand or turn of the head, creates forces that must be compensated for ahead of time, or else the hand will overshoot and create dangerous risk, or undershoot and be ineffective (Lee, 2009; Von Hofsten, 2007).

This prospectivity in movement establishes a future-orientation of human action that is both psychological and physical (Delafield-Butt & Gangopadhyay, 2013; Gilbert & Wilson, 2007). The anticipated goal or consequence of a movement is always ‘imaginary’ in the sense that it is not yet concrete. This mental projection serves to organise the actions of the disparate part of the body to serve its aims in order to realise and make ‘concrete’ the imagined future in its actual physical accomplishment (Delafield-Butt, 2014). Such basic prospective imagination does not necessarily require higher cognitive representation. At its ontogenetic beginning it is pre-conceptual and pre-reflective, giving vital coherence for efficient action across the body (Delafield-Butt & Gangopadhyay, 2013). Even in a task as evident as reaching for a cup, the physical goal of the act, contact with the cup, is held in the imagination as an impression rich with feeling and meaning of its inherent possibilities, until the cup is grasped in concrete, physical actuality. Similarly, a spin of the body or an action of the limbs made in exploratory dance is created in movement with an idea or image of the act that unfolds as the act progresses. This exploratory, dynamic goal nevertheless holds the same prospective psychomotor organisation that a pragmatic reach holds, necessitated by

motor mechanics (Bernstein, 1967) and informed by a basic affective appraisal of its result (Colombetti, 2011; Trevarthen & Delafield-Butt, 2015).

Importantly, these engagements with the future are not discontinuous or irregular events. Rather, they are regular *units* of psycho-motor processes generated with characteristic patterning in space-time. They initiate toward a goal, develop in their progression toward that goal, reach the goal in a moment of peak excitation, and appropriate their effect into the character of the organism. Human agency appears to be structured by these units of prospective action, first evident in the simple movements of the foetus well before birth (Delafield-Butt & Gangopadhyay, 2013). They develop through their serial organisation into ‘action chains’ of common purpose to allow complex tasks to be achieved, such as reaching and grasping for a toy, tying shoe laces, or getting dressed. Made together with social others, these projects can generate shared meaning in learning, giving understanding of the social value and utilitarian purpose of objects (Delafield-Butt & Trevarthen, 2013), a feature marked by the onset of shared attention and interest to objects in secondary intersubjectivity (Hublely & Trevarthen, 1979; Trevarthen & Hubley, 1978).

This is the beginning of the so-called ‘nine-month revolution’ (Tomasello, 1995) that initiates prolific development in shared learning of the manipulation of objects and other manual skills, including their conceptualisation, in what can be considered the origins of technical knowledge of the kind that educational systems seek to develop (Tomasello, Carpenter, Call, Behne, & Moll, 2005). However, as seminal educationalists such as Comenius (1592-1670) (see Murphy, 1995; Quick, 1868/1890) and Bruner (1996), or commentators such as the philosopher A. N. Whitehead (1929) remind us, learning is an adventure that involves the whole body and mind, rich with anticipation, feeling, and social importance. As social creatures, moral feelings of pride and shame colour and shape learning

experiences and the manner in which children engage, or disengage from learning with others (Trevarthen, 2011; Trevarthen, Gratier, & Osborne, 2014).

An Embedded Hierarchy of Prospective Organisation

Prospective control of movement is organised in an embedded hierarchy of purpose (Delafield-Butt & Gangopadhyay, 2013). It begins as (1) single, simple movements that can be (2) chained together to produce small projects. And these projects can themselves (3) be organised to produce projects of projects. Altogether, an embedded hierarchy of purpose is developed, where the intentions performed at lower levels colour and shape the unfolding intentions made at higher levels, and conversely, those made at higher levels structure those of the lower levels. A coherence of mind and action of bottom-up and top-down processing is achieved. In sum, these levels are as follows

(1) Action Unit. The first level of prospective, intentional organisation is the single action unit, or movement of continuous velocity toward a goal. Examples of action units include reach-to-grasp, reach-to-touch, a kick, turn of the head, or torso bend forward. Action units are typically completed within one second.

(2) Proximal Project. The second level of prospective, intentional organisation is the serial organisation of a sequence of action units into a short prospective project with proximal reach. The proximal project involves two or more single action units chained together to complete a simple task, such as reach-grasp-eat, reach-grasp-place, walk, or wiggle the head. Proximal projects typically range in duration from just over one second to about three seconds.

(3) Distal Project. These are compositions of proximal projects arranged to complete a more distal task. For example, cooking spaghetti requires a series of proximal tasks that open the cupboard, take the packet of spaghetti, open the packet, empty it into water, and so on.

Altogether a composition of proximal projects into distal ones can accumulate durations from just a few seconds to minutes, even hours and days.

As the goals of a project becomes more abstract, these distal projects begin to lose their bearing on time in the immediate moment. They become more abstract ‘cognitive’ projects involving extensive ‘off-line’ imaginative manipulation of symbols before being returned to lower levels in their actualisation through public, expressive gesture and language (Delafield-Butt & Trevarthen, 2013). Thus, the abstract distal goals of higher cognition are less structured by physical space and involve instead the arbitrary concepts, signs, and symbols of a culture, but are nevertheless composed bottom-up of the same motor logic and must be expressed top-down through that same psycho-motor organisation (Lashley, 1951).

Within each stage, or level of action organisation, the same principles of agency, prospective organisation, perceptual control, and satisfaction in the success of accomplishment and learning apply. These are principles of learning by active agency, with success in accomplishment leading to learned patterns of behaviour that may be repeated, and the positive affective valence associated with successful acts render them likely to be repeated. Furthermore, for successful accomplishment at higher levels, action carried out at the lower levels must be efficient and effective or the higher aim will be thwarted, requiring attention and resource to correct and compensate for errors, for *e.g.* as appears to be the case in autism spectrum disorder (Solomon, Holland, & Middleton, 2012; Trevarthen & Delafield-Butt, 2013a). Experience and agency require success at all levels of organisation for coherence to be achieved.

Embodied Narrative Knowledge: From Protoconversation to Shared Cognitive Projects

Motor projects of the kind discussed above appear to be the origin of social narrative understanding (Delafield-Butt & Trevarthen, 2015). Engagements with objects and engagements with people appear to hold the same principle of the serial organisation of

action, whether made in movements of objects or in movement of feelings and thoughts in gesture with others. They are both purposive and chained in sequences to give larger meanings with greater spatiotemporal reach, *i.e.* they expand the range of possible accomplishments of the agent, an increase in its ‘behaviour space’ (Trevarthen, 1978), or ‘affordances’ (Gibson, 1979) of possible intention manifest in action.

Such narrativity in solitary projects of exploratory play or utilitarian action, or narrativity in the unfolding protoconversational engagement between infant and adult (Malloch & Trevarthen, 2009) structure the cognitive and social cognitive worlds of the young child (Gratier & Apter-Danon, 2009; Gratier & Trevarthen, 2008). And they continue to do so throughout childhood, especially in school where formal learning becomes a primary focus of energy and attention. They are composed of a four-part structure of (i) introduction, (ii) development, (iii) climax, and (iv) conclusion (Figure 1).

The principle of sequences of expressive acts and the cognitive resources required remains the same. As these sequences become more complex and rational, mid-brain emotional and arousal regulation recede to the background of conscious attention and rational cognitive processes come to the foreground, occupying more time and attention in teaching and learning. But the regulatory processes of emotion and arousal do not become any less significant. All action must still be generated from and fed back through the midbrain brainstem complex and without learned patterns of regulation, such as permit social engagement learning with adults and teachers, this becomes difficult – student and teacher fall out of tune, and out of step with each other.

Making sense of experience through narrative patterns of engagement

Narrative is a foundation of meaning-making and culture (Bruner, 1990; Cobley, 2014). It is “inherent in the praxis of social interaction [even] before it achieves linguistic expression” (Bruner, 1990, p. 77). Read and Miller, social psychologists, consider narratives

to be “universally basic to conversation and meaning making” (Read & Miller, 1995, p. 143). Narratives provide a means by which we organise and make sense of our experiences (Kearney, 2002), evaluate our actions and understand our intentions (Cunliffe & Coupland, 2012), leading to positive learning experiences. Infants and children make sense of learning tasks by combining a series of smaller tasks, each containing small manageable projects with an identifiable beginning, middle and end, into larger projects, organising their intentions exerted on the world from single action units into small projects of sense-making and larger projects of projects of sense-making to work methodically towards a pre-determined goal. In this way, they can engage with a task through the successful completion of its smaller units, which they experience as individual positive achievements. Altogether these come together to create larger completed projects with their additional feeling of success and accomplishment. The child achieves satisfaction from these completed projects and retains the memory of a task successfully negotiated to achievement of its goal. This form of learning instils confidence in the young learner, enabling them over time to complete more complicated tasks requiring a higher level of social, motor and cognitive skill. Egan and Ling (2002) describe how these small projects, referred to as narrative episodes, act as a tool to facilitate the personal connectedness necessary for us to perceive, conceptualise and make meaning, by assisting the ordering and orientation of emotions, intentions, and actions.

The notion of embodied narratives of meaning-making also provides a methodological tool with which to analyse the intersubjective engagements of children. They give pictures of the lived experiences of the child to show the manner in which he co-constructs encounters with others. It is through repeated narrative encounters that children come to understand the forms and norms of human activity that make cultural sense of his actions, and those of others. Non-verbal, narrative analysis can describe the embodied, lived experience of individuals made with joint action, shared intentions, self awareness, awareness of others,

motivation and purpose, into an observable and measureable entity; a purposeful act displayed through gestures, expressions, affect and vocalisations.

We believe measure of the narrative patterns of participatory engagement can be used to investigate the nature of the interconnectedness of individuals, its successes and failures. Successful intersubjective interaction within positive relationships has been shown in infant studies of vocal patterning to display shared rhythm, quality and narrative form (Malloch, 1999; Malloch & Trevarthen, 2009). These are the hallmarks of creative musicality, which, together with expression in body movement, allows for the co-creation of meaningful experience in every day projects (Trevarthen & Delafield-Butt, 2013b) that establish cultures of meaning (Gratier & Trevarthen, 2008). Through examination of narrative episodes of intersubjective interaction we have set out to identify fundamental behavioural and relational patterns of engagement to better understand developmental principles of meaning making, and as a tool to understand individual children's progression.

Learning to Co-create Meaning in School: How Nurture Groups assist engagement with learning

We now turn attention to embodied, non-verbal narratives of meaning-making in school. In particular, it focuses on a special Nurture Group practice for children with so-called Social Emotional and Behavioural Difficulties (SEBD) (Boxall, 2002). Children who have difficulty communicating their feelings and interacting positively with others can find engaging with school learning difficult. They compensate by attending to other, non-scholastic activities, tasks and interests. They are not, to use American jargon, "on the same page". This leads to poor developmental gain and feeds back to re-affirm their social, emotional and behavioural disjunction with school society. They can become entrenched in their own sub-culture, as it were, an effect which holds a lifetime of downstream consequences.

These children struggle to form and maintain relationships and this impacts on their involvement in both the classroom and the playground. Engagement with objects and ideas requires sustained attention, itself requiring self-regulation of arousal and interest. In families where patterns of affective engagement may be disrupted or chaotic, a child's learned patterns of engagement with objects, ideas and social others can be similarly disrupted or chaotic. Emotional needs may also not be adequately met, further creating emotional tensions and strains that draw energy and attention away from self-regulated engagement with the classroom task. These children can enter school exhibiting SEBD.

In some cases these pupils can be assisted by psycho-educational support that works in affectively attuned relations with the children to help structure their arousal, interest, and attention to tasks and activities commensurate with school learning and classroom culture. These Nurture Groups employ especially trained teachers to work with the children in small groups, allowing one-to-one attention and personal relationships to form in a safe, secure and regular environment. They set out to develop social and emotional learning as a basis for classroom learning (Boxall, 2002).

Nurture Groups provide a recognised targeted early educational intervention in mainstream schools in the United Kingdom. They are designed to re-create missed early socio-emotional experiences for those children with SEBD whose needs cannot be met within a mainstream class and whose difficulties are considered to stem from disrupted intersubjective learning in the early years. The Groups were first established in the UK in 1969 by educational psychologist Marjorie Boxall as a response to growing numbers of children displaying SEBD in the classroom at school entry. Boxall recognised that these children shared similar home lives, where the characteristics of poverty, chaos and fractured family relationships resulted in missed early nurturing experiences that are essential for optimal social development. By careful attendance to social and emotional competence,

within small classes of up to twelve children, Nurture Groups assist the building of positive relationships between pupils, parents and staff (Billington, 2012). Additionally, the Groups improve educational engagement and academic attainment (Mackay, Reynolds, & Kearney, 2010; Seth-Smith, Levi, Pratt, Fonagy, & Jaffey, 2010), allowing the pupils to reintegrate to their mainstream class, usually within one year, where they can successfully engage in learning with their peers. Within the Nurture Group, relationships between the staff and pupils are considered of vital importance as a focus for change (Billington, 2012). Children appear to be enabled to co-create positive relationships with other pupils in the Groups, although the systems and psychological processes of learning new socio-emotional expectations and patterns of relation by which this happens, or the effects of this on socio-emotional development, have yet to be addressed. In the UK today there are over 1500 Nurture Groups in Nursery, Primary and Secondary schools (Nurture Group Network, 2016). Children attend the groups on a part-time basis, while continuing to have active involvement in their mainstream class.

Examination of Narrative Patterns of Learning in the Nurture Group

Two cases are examined where the Nurture Group teacher worked with a child to help structure his actions to develop a shared project that held common meaning. These projects were structured by teacher-guided interaction, but importantly they were actively co-created with initiative and energy by both pupil and teacher.

In the first scenario, the teacher and pupil share a simple task of descending the school staircase. They hold hands and walk down the steps together, the teacher counting the steps in rhythmic fashion and the pupil joining in as they descend. The staircase is composed of three flights of stairs with a landing between each. This physical space structures their engagement to produce three 'narrative' episodes, each with an introduction, rhythmic development, climax, and conclusion, with the complete descent down the full set of three

flights of stairs producing a narrative project that concludes with great show, especially in the child and shared between the two. Such shared narratives, we argue, are a cornerstone of affective, social and cognitive learning. They make an embodied, participatory sense of the world and generate shared meaning. Both the hand-holding gesture and the physical presence of the stairs keep the engagement tightly structured as the two couple their thoughts, feelings, perceptions and intentions through body action, gesture and vocal expression as they descend the stairs, reaching a moment of shared triumph and joy as the project completes and concludes.

Similarly, we identify a second scenario, where teacher and child engage in a Connect 4 game-play. This project is less structured by physical space (*c.f.* staircase and hand-holding during descent) and involves instead arbitrary and abstract cultural patterns of engagement that require cognitive understanding as well as control of affect, intention, attention and body action. In other words, this project involves the fundamental psychological dimension of school learning – the capacity to sit still, engage attentively by down- or up-regulating arousal, maintain attention and the intention to participate, and to do so intelligently and meaningfully.

By measuring and identifying the constituent elements of the two embodied narrative engagements, we attempt to illustrate the importance of the organisation of thought and action sequences (foot-steps, arm movements), each with their own psycho-emotional-motor dimensions of intention, feeling, evaluation and action, to establish projects that are built in caring, affective relations from which the abstract cognitions necessary for school learning can flourish.

Method

Measuring the composition of narrative patterns of engagement

Two video recordings of children engaged in everyday Nurture Group practice in two primary schools in Scotland were obtained. The recordings were selected to demonstrate the composition of narrative patterns of engagement evident in pupil–teacher interaction in Nurture Groups, with these selected cases each displaying a complete narrative structure. The first (Case 1) was sourced from a Channel 4 documentary film recording (Woods, 2011). The second (Case 2) was recorded by JA as part of a larger longitudinal study of teacher-child meaning-making in Nurture Group practice. In each case the recordings were made with children enrolled in the first year of primary school who were attending a Nurture Group within their school. Videos were micro-analysed to extract gesture and facial expression patterns, and annotated using the ELAN (Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands; <http://tla.mpi.nl/tools/tla-tools/elan/>) annotation package. Audio was extracted and vocal pitch analysed in PRAAT (<http://www.praat.org/>). Non-verbal narrative structures were identified through expressive body movements, facial expression and eye gaze. The duration, rhythm, timing and patterning of individual movements and vocalisations were measured, plotted and described.

Results

Case 1: Descending the Stairs Together, and Counting.

A thirty-one second joint interactive episode between a Nurture Group child and teacher as they engage in an everyday task, walking down the central school staircase was selected (Figure 2). The teacher and the staircase both structure the interaction, giving regular rhythm to the task with each step and framing the project by an anticipation of what is to come, guidance during the tasks and through its completion. The teacher opens the project, describing the task ahead as they walk towards the top of the stairs. Then, leading the child by the hand, the teacher counts the stairs as they walk down the three flights, negotiating two

turnings on the way. The overall project of descending the staircase presents an overarching narrative structure, which consists of the following:

- i) an **introduction** as the child and the teacher walk along the landing towards the top of the staircase. Preparing for the task they are about to embark on the teacher talks to the child, explaining the task ahead. She takes the lead as she encourages the child to count the stairs “*Now let’s count these stairs. Are you ready?*” as they start their first descent. Their task proceeds as the child shows his willingness to engage with their joint project, taking the teacher’s hand and joining with her to count the stairs together. The teacher’s vocalisations are regular and rhythmic, each with ascending pitch-glides that progress from below Middle C to the top of the octave above Middle C (*ca.*80Hz to *ca.*500Hz) (7 out of 8 utterances), encouraging arousal and interest in her partner (c.f. Malloch, 1999; Marwick & Murray, 2009; Trevarthen, 1999).
- ii) a **development** of the interaction between the child and the teacher as their vocalisations and footsteps fall into rhythm and the child is able to anticipate the counting of the next step. The pair negotiate a turning on the stairs which interrupts the rhythmicity of their action and the child looks to the teacher as she takes the lead, holding the child’s hand to keep him beside her and counting aloud, and their rhythmic footfall and counting returns. As the child becomes increasingly confident of his involvement in the interaction he excitedly starts to count ahead of their footfall as they negotiate a second turning, reaching a peak of **development** in their interaction, before the teacher re-establishes the rhythmic counting and they synchronise their actions and vocalisations for the final few steps.

- iii) A **climax** to the interaction is reached as the pair arrive at the bottom of the stairs and the teacher raises the pitch of her voice to the top of Middle C as they count the final steps together “*nineteen, twenty, twenty-one stairs*”. The pair share a moment of joy in completing the task, expressed as a broad smile from both child and teacher as the child lets out an exclamation, “*woo-hoo!*”
- iv) A **conclusion** to the journey as they walk away from the staircase, satisfied with what they have achieved, the teacher confirming the success of the task to the child, “*Good counting,*” leaving him with a positive memory as this task is left behind to move on to something new.

This complete narrative project of descending the staircase comprises a structure containing:

- i) seven separate distinct phases, identified **a-g**, which are carried out in sequence by the participants, enabling them to successfully complete the overall task.
- ii) three narrative sub-units, identified as **Sub-Narratives 1, 2, and 3**, each comprising a combination of successive phases towards achievement of the overall task, and with each episode describing a smaller, shared project with its own introduction, development, climax and conclusion, embedded within the larger task.

Thus, the seven phases describe:

- a) the organisation or setting up of the activity as the child and teacher walk towards the top of the staircase, coming together from their own separate previous activities to participate in a shared task. The teacher structures the interaction, taking the child's hand and inviting him to join her in this shared activity. The child responds willingly, holding the teacher's hand and contributing his enthusiasm to share in the activity.
- b) walking down the first section of stairs together. As they start to descend the stairs the teacher begins counting "*one, two*" before the child joins in "*three, four, five*" as they descend to the first turning and their footsteps and vocalisations begin to align. The teacher shows sensitivity to the child's willingness to engage in the task, responding appropriately to build confidence in his ability to perform the activity successfully.
- c) a transition as they negotiate the first turning on the stairs. Their footsteps fall out of alignment with each other and the teacher ensures the child's continued attention to the task as she says "*Right*" and guides him by the hand to the next step.
- d) walking down the second section of stairs together. The child's attention has been successfully concentrated on their continuing journey by the teacher and he counts the next step "*six*" before the teacher comes in with a deliberate "*six*" in conjunction with placing her foot on the next step. The teacher steps and counts aloud in a rhythmic manner "*seven*" and the child falls into alignment as they count together "*eight, nine, ten*" as they share eye contact and smile.
- e) a transition as they negotiate the second turning. The child excitedly counts quickly ahead of their footfall "*nineteen, twenty, twenty-one*" as they turn the corner of the stairs, displaying enthusiastic involvement in the task.

- f) walking down the third section of stairs together. The teacher again maintains structure and rhythm, responding to the child's willingness to perform the task, as she purposefully counts aloud "*eighteen*" as she places her foot on the next step. In doing so she responds to the child's over-excitement and contains it within the boundaries of the structure they have created. The child falls back into step and together they count "*nineteen, twenty, twenty-one*" as they complete the final steps of their journey.
- g) reaching the bottom of the stairs together, the child breaks into a broad smile and exclaims "*woo-hoo*" as the teacher also smiles in a shared moment of satisfaction.
- h) an acknowledgement by the teacher of a project successfully completed as she says to the child "*Good counting*" and they walk away from the staircase together, ready to start something new.

In summary, the shared narrative project of descending the staircase together, and counting, was formed altogether by three individual, yet complete narratives, called sub-narratives here, each displaying its own introduction, development, climax and conclusion. The transition points were formed by the small landings between flights of stairs, forming a natural break in the psychological development of the overall narrative that concluded what came before it and at the same time initiated what was to come. These points, "**c**" and "**e**", create breaks between the sub-narratives where the rhythmic quality of interaction was interrupted and the partners re-negotiate their actions and intentions prior to embarking on a new sub-narrative, working toward completion of the overall project. In this way, 'stories within stories' were evident, structured by the physical environment and manifest by the psychomotor need to navigate it purposefully and efficiently.

Sub-Narrative Episode 1 comprises the setting up of the complete project and the journey down the first section of the staircase. There is an **introduction** to the project as the child and teacher come together and the teacher explains to the child the task that they are about to embark on. The project **develops** as the child and teacher begin to share in the task and become actively engaged towards achieving their goal. This stage is dependent upon the child being willing to engage with the chosen task and the teacher responding with sensitivity to his individual needs. A **climax** is reached although not fully completed as they reach the first turning on the stairs and their interaction plateaus as the child begins to dis-engage from the interaction, with a small **conclusion** to the episode as they recognise the achievement of the first stage of their task and turn their attention to the next stage.

Sub-Narrative Episode 2 comprises their descent down the second section of the staircase. There is an **introduction** as the child and teacher negotiate their activity, taking a couple of steps to align their footsteps and vocalisations, before falling into rhythm. This episode displays positive engagement and alignment of goals, with the partners sharing positive affect and rhythmicity of action through the **development** of the engagement. A **climax** to the interaction is reached as the child becomes increasingly engaged and excitedly counts faster, ahead of their footfall. The teacher **concludes** the episode by counting aloud in a rhythmic manner with each corresponding footfall, re-structuring the interaction, which briefly plateaus before entering a new episode.

Sub-Narrative Episode 3 comprises the final descent of the staircase. The child and teacher both display active engagement in the project at the **introduction** to the final descent, quickly **developing** their interaction through rhythmic footfall and counting, with the teacher raising the pitch of her voice, bringing an active **climax** to the project as they reach the bottom of the

stairs. The episode **concludes** quickly as the child and teacher walk away from the successfully completed task, each sharing in the joy of a successfully completed project.

Case 2: Playing a Game Together, and Winning

A Nurture Group game play session of Connect 4 between teacher and child of almost five minutes duration was selected for analysis. The session was composed of five games, punctuated by four phases of tidying up and setting up for the next game (Figure 3). The object of the game was for each participant to take turns placing one of their coloured counters (small discs) into columns of the game board held vertically upright, with the objective of obtaining four coloured counters in a row. Each game unfolding between teacher and pupil was organised along approximately the same narrative template of joint activity, and altogether these formed a narrative structure co-created by both pupil and teacher spanning the full five minutes.

Analysis of the complete five-minute game play session identifies an overarching narrative structure consisting of:

- i) an **introduction** as the teacher invites the child to play and they make their way to the table where they set up the game together. The teacher takes the lead assembling the game board and the child assists. The teacher then invites the child to start the game play by taking the first turn, with a joint assumption that the rules of play are understood by both.
- ii) a **development** of the interaction between the child and the teacher as their play falls into a rhythm, each taking turns to place their counters in the game board. At points the child becomes distracted from the game, placing his counters in the board ahead of his turn before falling back into the rhythmic turn taking as his attention is brought back to the game.

- iii) a **climax** which is reached at the end of the final game as the child and the teacher share a moment of joy in completing the task, expressed as a whoop of joy as both child and teacher throw their hands in the air.
- iv) a **conclusion** to the task as the child starts to lose attention to the game and the child and teacher tidy away the game ready to move on to something new.

This overarching narrative structure describes the complete shared project and comprises five observable narrative sub-units, each describing a small, shared project embedded within the larger task, identified by episodes of game play punctuated by periods of transition where the game board is disassembled and prepared for the next game. The sub-units each display their own narrative structure. A single, non-verbal shared interactive game play sub-narrative was selected for analysis (Figure 4).

The example displays a typical narrative pattern of dyadic interaction. The child and teacher share in turn-taking game play, communicating through a shared repertoire of interest, attention, actions and emotions to achieve a pre-determined and mutually shared goal, *i.e.* winning the game. This episode of game play of less than half a minute contains smaller units of play, *i.e.* individual turns, each lasting around three seconds.

The game involves dropping coloured counters into a game board with the aim of achieving four in a row of the same colour. The child's turns are identified **a, b, c, d** and the teacher's corresponding turns are identified **a', b', c'**, with the arm movement action curves corresponding to the picture storyboard above the diagram. The turns show a rhythmic quality, with the child's turn "c", during which difficulty with the game board was encountered, lasting the duration of two turns. Each diagrammatic curve displays a complete child or teacher arm movement, encompassing the "reach", "grasp" (of the game counter), arm "raise", "place" (counter at the top of the game board), "release and drop" (of the counter into the board) and "return". The "release and drop" of each counter is illustrated with a

vertical line at the accompanying intensity marking and displays the rhythmicity of play. The timing of movements is organised in purposeful, expressive action sequences. The child and teacher remain attentive to the game without distraction, with the game board providing a common focus of attention throughout, as identified through their eye gaze patterns. As the child becomes familiar with the pattern of play, he is able to anticipate his next move and his arm movement commences earlier.

Each partner shows awareness of the effects of the other's actions, adjusting their own actions to compensate by placing their counters in a specific column with the aim of achieving their desired goal (achieving four in a row). Each partner has his or her own motives, intentions and feelings which are displayed through their actions, responses and emotions, joining together in the intersubjective co-creation of meaning. As the child reaches his final turn “**d**” he breaks into a broad smile at the realisation that he is about to win the game and the teacher reciprocates with a smile. Following the completion of his turn, he immediately raises his arms in the air and lets out a joyous exclamation “*Yeah!*” which is identified by a downward pitch from 24 *sec* duration mark (**e**), drawing to a close this gameplay narrative. At the same time the teacher takes a sharp inhalation of breath (**e'**), sharing recognition that the child has won the game. The child, recognising the social aspect of the game, turns his attention to the other teacher in the room who is sitting to his right, inviting her to share in his joy and recognising this dyadic interaction as part of a wider group interactive experience, and his game partner follows his gaze, with the moment of joy being shared by all three.

Discussion

Co-Creating Success and Shared Joy in Narrative Projects

The joy of the children made on completion of the shared narrative projects in both cases was palpable. The teachers worked with the children encouraging their participation and giving support to their engagement. In the first case, the teacher held the child's hand, physically guiding him down the stairs as she verbally narrated what was to come, how they were proceeding, and how they would conclude their project. Her verbal narration spoke to higher cognitive learning, placed atop the embodied and affective project in which they engaged. The successful completion of the project was marked by an exclamation of joy from the child, "*Woohoo!*", with a word and a smile of satisfaction from the teacher, a job well done. All that the project encapsulated – the tension of anticipation at the start, the build up to the first step, the complex coordination of motor activity in the descent, the maintenance of attention, arousal and affect during the descent – was of such high standard that the child was able to join in the verbal aspect of counting the steps. Indeed, as his confidence grew, he enthusiastically began to lead. It is important to remember, however, that even the nonverbal project of descending stairs with another requires intelligence and learning: motor cognition of body coordination for an efficient descent and social cognition of known patterns of affect and arousal co-regulation. Before higher linguistic and conceptual learning can take place, these affective and embodied patterns must be known.

In the second case, the child and teacher structure the interaction together, showing awareness of the other's actions, joining together in a non-verbal project, each with their goal in mind. As the child becomes more familiar with the game play and the co-ordination of cognitive skill and motor action required to complete the project, he commences his reach-grasp-raise-drop action sequence earlier, beginning his turn before the teacher has completed hers. This demonstrates an awareness of the patterns of activity with its expectations, which can lead to development of conceptual learning. The successful completion of the project, marked by an exclamation of joy from the child, "*Yeah*" and a sharp intake of breath by the

teacher, and shared with the other teacher in the room, marks the pleasure derived from concluding a piece of mutually shared activity. A narrative pattern with its patterns of expectation, affect and arousal co-regulation, and participatory engagement has been learned.

Learning Narrative Schemas of Embodied, Affective Knowledge

Projects that are successful are repeated, and those that fail are not repeated. Success can often be marked by the joy of completion, giving pride in accomplishment with others. Seminal child psychologist Mark Baldwin (1895) noted that from birth, successfully accomplished actions are repeated time and time again in what he called the ‘circular reaction’. But this ‘reaction’ even at this young age was not an unconscious reflex, but rather consciously generated by the infant to produce a particular action pattern.

“The self-repeating or 'circular' reaction, to which the name 'organic imitation' is given... is seen to be fundamental and to remain the same, as far as structure is concerned, for all motor activity whatever: the only difference between higher and lower function being, that in the higher, certain accumulated adaptations have in time so come to overlie the original reaction, that the conscious state which accompanies it seems to differ per se from the crude imitative consciousness in which it had its beginning.” (Baldwin, 1895, p. 23)

The fact that successful acts were repeated again and again gave the appearance to Baldwin of their circularity, where the agency of the child ‘imitated’ successful acts that came before, again and again. This repetitive ‘circularity’ is clearly seen in the playful activities of toddlers and nursery school children, especially in playful games with great joy where a resounding chorus of enthusiasm to repeat the fun is commonly exclaimed, “*Again! Again!*” (Featherstone, Beswick, & Louis, 2008). Educationalists recognise the importance of this circularity in work with young children.

Piaget worked on the back of Baldwin's studies of the importance of circularity to coin the term 'schemas' to account for the regular patterns of activity that develop from sensorimotor to conceptual patterns as the child develops (Piaget, 1953; Piaget, 1954). Children's 'pleasure in mastery' of these patterns are learned and shared with others, co-creating shared understanding (Trevvarthen & Delafield-Butt, 2015). Children's schemas are a mainstay of teacher education (Meade & Cubey, 2008; Nutbrown, 2008), especially in work with young children before formal schooling.

The narrative patterns we have identified in this paper are schemas of a kind. They are units of process that can be learned as 'objects', regular patterns of action and response. Successful completion brings repetition and learning. Co-created narrative episodes become appropriated into the memories and thoughts of the child, rich with social value and affective as well as cognitive meaning. It is not difficult to suppose the child in Case 1 subsequently descended those stairs counting as he did so, on his own, after the fact of his shared encounter, but recalling its process and form in memory. In this way, children learn socially accepted patterns and their conceptual implications.

The principle of Nurture Groups is to re-enact the social and emotional dimensions of early learning usually present in the first three years of life, to enable a child with socio-emotional 'difficulties' to learn patterns of affect and arousal regulation that afford classroom based learning (Boxall, 2002). It is important for educationalists and psychologists to remember that joy inherent in successful action is paramount to successful learning. This can be forgotten in school when the technical accomplishment of the act begins to take centre stage and the value of emotional expression recedes to the background. The cases we describe in this paper demonstrate a nurturing style of teaching, where the teacher displays sensitive response to the child's willingness to perform the chosen task, creating opportunities for children to lead the way in their own learning as they build confidence through the

pleasure of achievement. The role of joy, as experienced by children through early years play, in driving the act and fixing its successful process in memory for retrieval and re-enactment later does not lose its psychological and educational importance in later years.

Learning within the Zone of Proximal Development

Nurture Groups are afforded various theoretical explanations, the most central of which is attachment theory (Bowlby, 1969). Aspects of Bowlby's theory are useful to explain the reasons behind the social, emotional and behavioural difficulties experienced by children who are referred for Nurture Group intervention. These children have routinely experienced disrupted family relationships in the earliest years of life and often display behaviours associated with attachment difficulties. However, Bowlby's theory falls short of providing understanding of the mechanisms of change by which Nurture Groups achieve successful outcomes for children. It has been suggested that the more educational elements of Nurture Groups could be better understood by reference to Vygotskian theory (Garner & Thomas, 2011). Indeed, this paper describes two cases from Nurture Group practice where expert adults contain, regulate and negotiate meaning and knowledge with less expert children. These narratively organised interactions, found to be commonplace in Nurture Group teaching, provide new understanding of the components of learning and teaching within the Zone of Proximal Development described by Vygotsky.

Toward an understanding of learning as embodied, affective meaning-making in shared narrative projects.

Learning requires a hierarchy of levels of organisation of action, arousal and interest, each requiring attention, affect regulation, cognition, and energy to create, from both sides, teacher and pupil. These projects with their rich social and affective dimension, teach patterns of acceptable social interaction and engagement. At the most basic, these actions are simple and goal-directed, for e.g. reaching and dropping the counter into a slot, organised in a

social composition to produce a game with a negotiated and anticipated ending, collectively building a 'game of games' over a five-minute session. Coherent and meaningful social participation requires regulation of affect, intention, arousal and interest to maintain co-operative engagement throughout the period, organised in an embedded, regular hierarchical structure.

The child's Nurture Group experience is composed of a variety of solitary and social projects, such as those described above, through which they learn how to interact in the culture of a co-operative society. Such learning allows the child to engage with others and with the experience of learning, creating the desire and ability to draw on their newly acquired skills to achieve future goals.

Conclusions

In sum, we have presented theory to demonstrate embodied social engagements as organised by regularly patterned units of narrative meaning-making. These are deeply affective as well as cognitive. They develop knowledge of persons and objects through the processes of engagement structured by a prospective, or anticipatory framework. They are schemas expecting certain results from certain actions, with their cognitive and affective dimensions developed, learned, and re-enacted through social engagement and imaginative solitary activity.

Our observations of Nurture Group classroom practice identified two particular cases of these unified mind-body units of meaning-making. We consider these to be core units of experience for learning. We show how and why emotion is part-and-parcel of embodied learning and of engaging effectively with others. Altogether our theoretical perspective and observations of classroom practice describe a particular, sensitive teacher attunement to the

rhythms and feelings of the children that helps to encourage their active participation, sense of agency, and successful accomplishment in narrative episodes of co-created meaning-making.

Knowledge of the ways in which learning is structured in units of meaning-making can assist teaching practice to reach children through attunement of feeling and body movement, generating companionship as the basis of learning shared projects of discovery.

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Figures

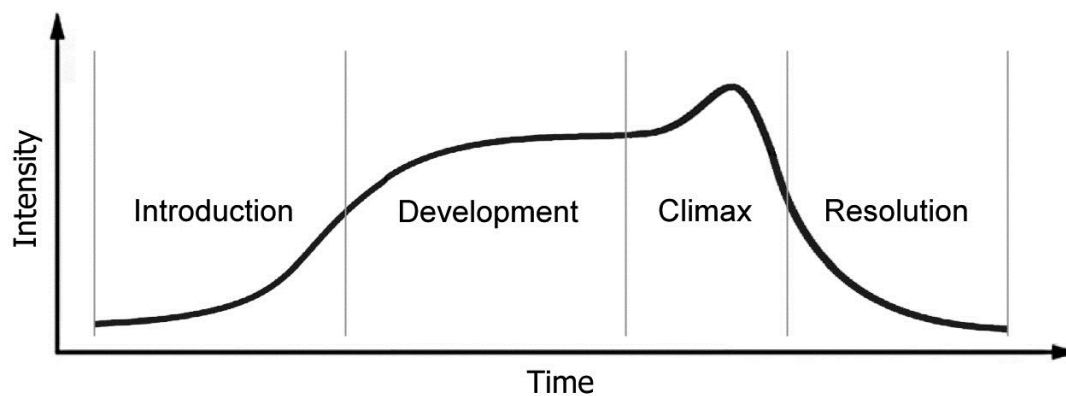


Figure 1. Narrative intensity contour of affective and expressive engagement in a project over its four phases: (i) interest and engagement in the project begins at a low-intensity in the *introduction*, which invites participation; (ii) the coordination of the actions, interests, and feelings of participants intensifies over the *development*, as the project is developed; (iii) a peak of excitement with achievement of a goal in mutual intention is reached at the *climax*; after which (iv) the intensity reduces as the purposes of the participants share a *resolution*, allowing them to move on to other projects, whether together again or separate. From Trevarthen and Delafield-Butt (2013).

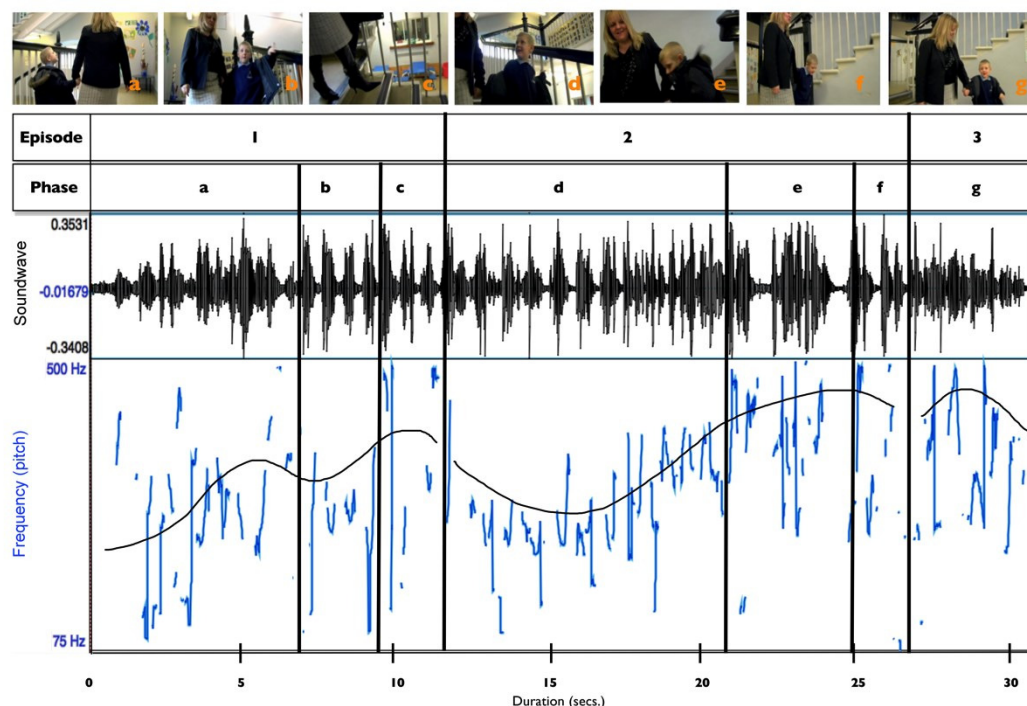


Figure 2. Case 1: A co-created narrative project, “Descending the staircase and counting.” A picture board illustration (top row) organised by its three episodes (1-3), the first two with three phases (a-c; d-f) and final one with a single phase (g). The sound wave shows clearly marked rhythmicity of vocalisations by teacher and student. The sound wave spikes indicate footfalls on the steps. The pitch of each vocalisation is calculated (frequency, Hz) and plotted. The dyadic structure of child-teacher interaction displays a narrative pattern of intensity and progression as the pair move through the phases of **introduction** to the task, **development** of rhythmic shared interaction as they descend the stairs together, a **climax** as they share simultaneous joy on reaching the bottom of the stairs, and a **conclusion** of the activity as they leave this activity behind to commence something new. Narrative contours (black) approximately overlay the rise and fall of vocal pitch.

(a) **Introduction** as the teacher structures the opening of the interaction, explaining the task ahead as they walk towards the top of the staircase. (b) **Development** as they descend the first section of stairs, their footsteps falling into rhythm as they count the stairs together. (c) A

small **climax** marked by excitement in vocal pitch as they reach the first turning, quickly **concluding** and leading straight into a limited **introduction** to the next task as they negotiate this first turning and make their way to the second flight of stairs. **(d)** a second **development** begins as the child looks to the teacher as she counts the stairs aloud to re-establish their rhythm and **(e)** smiles as they share understanding of their collaborative activity. This reaches a second small **climax**, this one larger than the first, as they reach the end of the flight of stairs, and begin to negotiate the second turning, leading to the final sub-narrative. They **(f)** **develop** this task by concentrating together on its completion as they descend the final flight of stairs before **(g)** they share a final **climax** of peak satisfaction and joy as they reach the bottom, the teacher smiling as the child lets out a whoop of joy. The piece **concludes** as they leave the staircase behind, now quiet, and head towards a new activity.

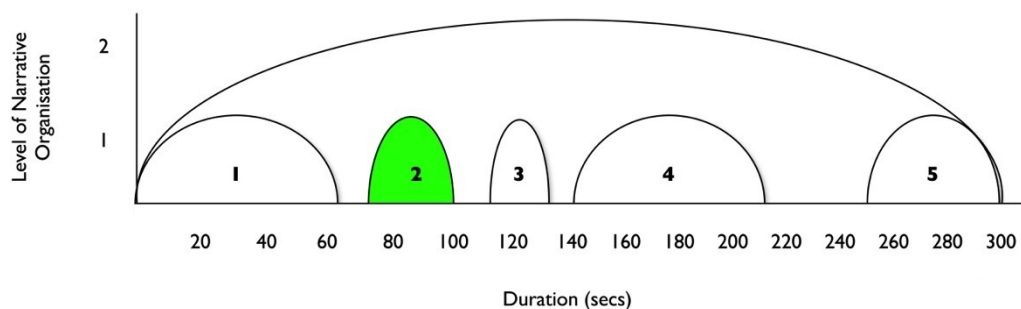


Figure 3. Schematic of the complete game play session in Case 2. Individual Connect 4 games are illustrated by arcs, punctuated by periods of transition when the pieces were gathered up and sorted (not illustrated). Altogether the overall gameplay session lasted nearly five minutes. Analysis of individual episodes reveals a recurring narrative pattern in each game. A micro-analysis of Episode 2 (shaded) is presented in Figure 4 to describe this pattern.

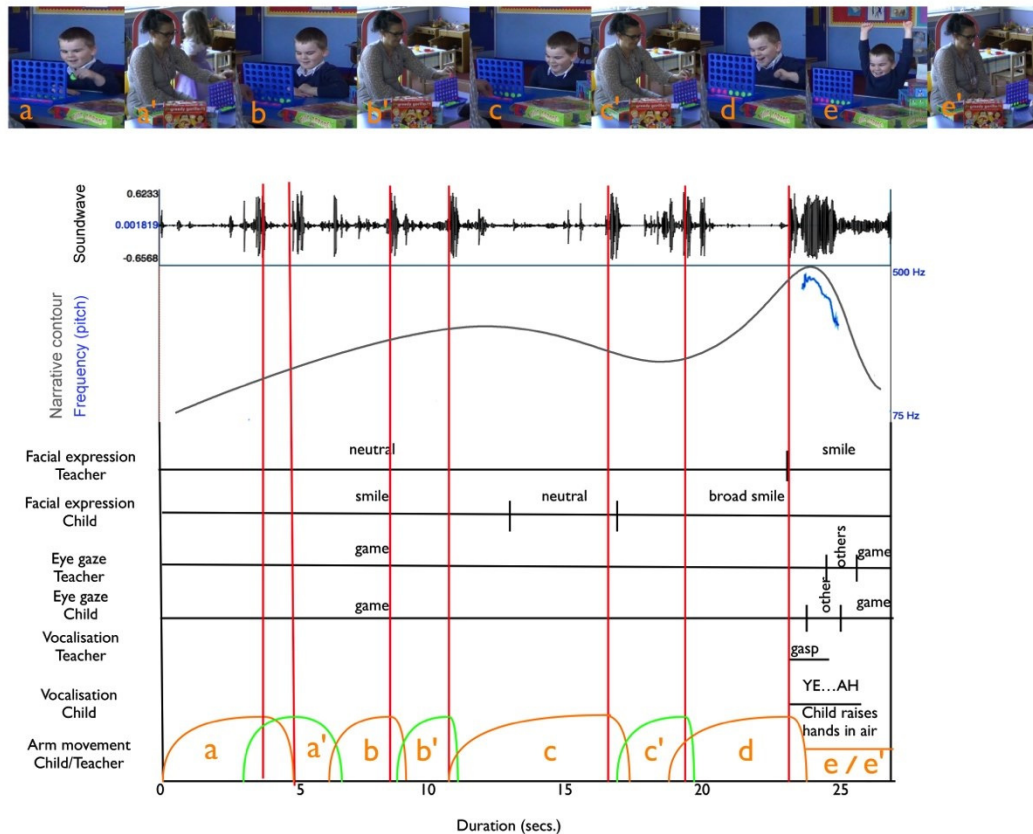


Figure 4. Narrative pattern of dyadic child-teacher Connect 4 gameplay. The soundwave indicates the fall of the tokens into the game, together with background classroom noise. Acoustic frequency of vocalisations is registered only at the final vocalisation of “Yeah!” by the child – no other vocalisations were made. The narrative contour of intensity approximately follows the combination of vocal pitch, facial expressions of teacher and child, eye gaze, gestures, expressions, and teacher and child vocalisations. The narrative develops through cycles of gameplay turn-taking. The child’s turns are identified by the action curves **a, b, c, d**, with the teacher’s corresponding turns identified **a’, b’ and c’**. Each action curve indicates a reach-grasp-drop – the drop indicated by the red vertical line segmenting the piece – and final return of the hand to the table. The climax to the interaction at **e/e’** is identified by the child’s high pitch exclamation, “Yeah!”, at the top of Middle C with a downward glide as

he simultaneously throws his arms in the air and the teacher takes a sharp inhalation of breath. The child and teacher are attentive to the game throughout while recognising it as part of a greater social interaction as they share their joy with the other teacher (other) in the room on completion of the game.